

## **REMARKS**

### **Allowable Subject Matter**

Claims 1-28 and 31-44 are pending. In light of the Restriction Requirement, the Office Action states that claims 2, 3, 5-19, 27, and 29-40 are withdrawn from consideration.

Thus, claims 1, 4, 20-26, 28, and 41-44 are under consideration. Of the claims under consideration, **claims 22-26 are not rejected** in this Office Action, or the prior Office Action.

Thus, it is applicants understanding that these claims recite allowable subject matter.

Clarification is respectfully requested.

### **Amendments**

Claims 1 is amended to delete the anions of Formulas (II-3) and (II-4). Claims 29-30 are cancelled. Claims 31-37 are amended to be consistent with the language of amended claim 1.

### **Rejection under 35 USC 103(a) in view of Chapman and either Sartori or Heider**

Claims 1, 4, 20, 21, 28, and 41-44 are rejected as being obvious in view of Chapman et al. (US 5,876,821) in combination with either Sartori et al. (US 6,210,830) or Heider et al. (US 6,423,454), and further in view of the excerpt from “The Chemistry of Synthetic Dyes and Pigments,” edited by Lubs and Busman et al. (US 5,541, 235).

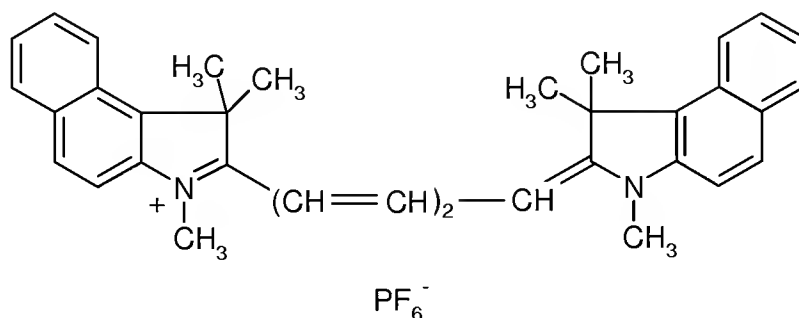
In general, the disclosure of Chapman et al. is directed to optical recording elements and the recording layers applied thereto. In particular, Chapman et al. disclose a dye mixture for use in a recording layer. The dye mixture is said to have, at 780 nm, a real refractive index of not less than 1.8, and an imaginary part which is not greater than 0.15. Additionally, the dye mixture comprises (a) a tetra dye having a metallized azo dianionic dye with a cationic dye counterion, and (b) at least one other dye having a structure in accordance with Chapman et al.’s Formula I.

As noted in the rejection, Chapman et al. disclose that cation of the dye of Formula I can preferably be that of a cyanine dye having the formula shown at column 6. This entity exhibits the following structure:  $-T^{+}=C-[CH=CH-]_{1-2}-CH=C-T^l-$  where T and T<sup>l</sup> are each N,

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O, or S. This structure exhibits 3 to 4 methine (-CH=) linkages (not 3 to 5 as mentioned in the rejection.

The rejection also refers to dye B-3 disclosed by Chapman et al. at columns 3 and 17. This dye is of the following formula:



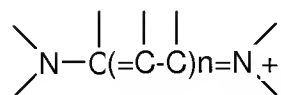
This dye exhibits the structure:  $-\text{N}^+=\text{C}-\text{CH}=\text{CH}-\text{CH}=\text{CH}-\text{CH}=\text{C}-\text{N}-$ . As applicants noted previously, this is a carbocyanine dye, not a cyanine dye (compare applicants' claim 20). See also the carbocyanine cation 5e at page 17 of applicants' specification.

The recording elements made using the dye mixture of Chapman et al. are said to have "greater sensitivity" in compared to recording elements using tetra dyes. See column 2, lines 9-13 and column 2, lines 57-60. Table 7, at column 15, presents results that show that Chapman et al.'s dye mixtures have somewhat lower light stability than tetra dyes alone but greater light stability than a dye of Formula I alone.

Regarding dye B3, of the Examples listed in Table 6 only Example 3 contains dye B3 (in admixture with dye A3). This Example exhibited a low optical density, i.e., lower than that exhibited by dye A4 alone (see comparative Example 1).

The rejection argues that the excerpt from Lubs discloses that cyanine dyes can be classified as methane or polymethine dyes. Lubs also discloses that cyanine dyes are grouped separately because they have a different use, i.e., they are used as photographic sensitizers rather than as textile dyes. It is further argued in the rejection that Lubs classifies dyes like B3 of Chapman et al. as carbocyanine dyes.

Lubs discloses that cyanine dyes exhibit a structure of the following formula:



Further, Lubs discloses that when  $n$  is 0, the dye is a monomethine or simple cyanine, but that

when n is 1 the dye is a trimethine or carbocyanine. When n is 2 or higher, the dye is a higher carbocyanine, e.g., tricarbo-cyanine when n is 3.

The disclosure by Lubs does not add anything to the disclosure of Chapman et al. As noted above, the dye B3 of Chapman et al. exhibits the structure:  $-N^+=C-CH=CH-CH=CH-CH=C-N-$ . Under the Lubs definition, dye B3 is a carbocyanine dye (as applicants' noted previously) not a simple cyanine dye.

Busman et al. disclose associating cationic dyes with certain cationic dyes display improved solubility in organic media. Specifically, Busman et al. disclose that these are cationic dyes associated with a) imide anions containing at least one highly fluorinated alkyl or perfluoroalkylsulfonyl group, b) methide anions containing at least two highly fluorinated alkyl or perfluoroalkyl sulfonyl groups or c) (highly fluorinated alkyl or perfluoroalkyl) aryl]borate anions. See column 3, lines 8-27. Busman et al. disclose that the anions of their invention are generally classified as highly fluorinated (including perfluorinated) alkylsulfonyl methides, iralides, and polyhighlyfluorinated (including perfluorinated) arylborates. See column 3, lines 40-43. Specific examples of the anions are disclosed at column 4, lines 34-57.

Thus, the disclosure of Busman et al. is limited to certain anions. Busman et al. clearly do not disclose that all fluorinated anions are suitable for use in their invention. More particularly, Busman et al. do not disclose that all anions used in electrolyte salts for batteries can be used in their invention.

The anions disclosed by Busman et al. are not FAP anions. In the rejection, reference is made to the anion of Example 1 of Busman et al., i.e.,  $(CF_3SO_2)N^-$ . This anion is not an FAP anion. Additionally, while Busman et al. disclose that this particular anion was obtained from a battery electrolyte, Busman et al. provide no suggestion that all anions used in battery electrolytes can be used in their invention.

The Examiner argues that it would be obvious to modify this dye of Chapman et al. by replacing the hexafluorophosphate anion,  $PF_6^-$ , with a fluoroalkylphosphate anion in view of the teachings of either Sartori et al. or Heider et al. It is acknowledged in the rejection that the dye of Chapman et al. has a hexafluorophosphate anion,  $PF_6^-$ , rather than an FAP (fluoroalkylphosphate) anion. With respect to FAP (fluoroalkylphosphate) anions the rejection refers to the disclosures of Sartori et al. (US '830) and Heider et al. (US '454).

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Sartori et al. disclose lithium fluoroalkylphosphates of the formula  $\text{Li}^+[\text{PF}_a(\text{CH}_b\text{F}_c(\text{CF}_3)_d)_e]^-$  wherein: a is 1, 2, 3, 4 or 5; b is 0 or 1; c is 0, 1, 2 or 3; d is 0, 1, 2 or 3; and e is 1, 2, 3 or 4. In addition, the sum of a+e is equal to 6, the sum of b+c+d is equal to 3, and b and c are not simultaneously 0. These lithium salts are said to be useful in electrolytes and lithium batteries made from such electrolytes. See column 1, lines 4-20.

Sartori et al. also disclose that lithium hexafluorophosphate is known to be used as a conducting salt in lithium secondary batteries, but that this lithium salt has the disadvantage of relatively little resistance to hydrolysis. Sartori et al. also disclose that their new lithium fluoroalkylphosphate salts can be used in place of lithium hexafluorophosphate, and that these new lithium fluoroalkylphosphate salts are resistant to hydrolysis in aprotic polar solvents. See column 1, lines 39-41, column 2, lines 8-10, and column 4, lines 37-42.

Heider et al. also disclose lithium fluoroalkylphosphate salts, specifically salts of the formula  $\text{Li}^+[\text{PF}_x(\text{C}_y\text{F}_{2y+1-z}\text{H}_z)_{6-x}]^-$  wherein  $1 \leq x \leq 5$ ,  $3 \leq y \leq 8$ , and  $0 \leq z \leq 2y+1$ , with the exclusion of compounds of the formula  $\text{Li}^+[\text{PF}_a(\text{CH}_b\text{F}_c(\text{CF}_3)_d)_e]^-$  (see Sartori et al.). As with the disclosure of Sartori et al., Heider et al. also disclose that lithium hexafluorophosphate has been used in lithium batteries as an electrolyte salt, and that this salt is extremely hydrolysis-sensitive. Heider et al. further disclose that their lithium fluoroalkylphosphate salts can be used as electrolyte salts in batteries, and that their salts are resistant to hydrolysis. See column 1, lines 17-24, column 1, lines 53-58, column 2, lines 21-31, and column 9, lines 16-57.

In the rejection, it is asserted that it would be obvious to replace the hexafluorophosphate anion,  $\text{PF}_6^-$ , in the dyes of Chapman et al. with a FAP anion, as disclosed by Sartori et al. or Heider et al. to obtain greater solubility based on the disclosure by Busman et al.

However, Busman et al. provide no disclosure relating to FAP anion. The improved solubility disclosed by Busman et al. is directed to specific anions which do not include FAP anions. Busman et al. do not disclose or suggest that any anion used in an electrolyte salt in a battery can improve solubility.

As noted previously, FAP anions behave differently than the hexafluorophosphate anion,  $\text{PF}_6^-$ . In contrast to the  $\text{PF}_6^-$  anion, FAP anions are weakly coordinating anions and thus will have low interaction with the cationic portion of the dye. The impact of these

weakly coordinating anions on properties of the dyes such as color, chemical and thermal stability would not be known nor could they be predicted based on the properties of the  $\text{PF}_6^-$  anion with respect to dyes.

In the Office Action, it is argued that the data presented in Tables 5 and 6 is not persuasive because it does not involve a comparison with the closest prior art, which the Examiner argues is dye B3 of Chapman et al. However, applicants argue that this data does demonstrate that one can not simply establish an expectation of properties for  $\text{FAP}^-$  dyes based on the properties of  $\text{LiFAP}$  salts or  $\text{PF}_6^-$  dyes.

The lithium salt  $\text{LiPF}_6$  has low solubility in water. In comparison,  $\text{LiFAP}$  salts have very good solubility in water. Like  $\text{LiPF}_6$ ,  $\text{PF}_6^-$  dyes have low solubility in water. Thus, based on the properties of  $\text{LiFAP}$  salts, one might expect that  $\text{FAP}^-$  dyes would have good solubility in water. Yet,  $\text{FAP}^-$  dyes have poor solubility in water. See, e.g., Tables 5 and 6 in applicants' specification at pages 90 and 92.

In view of the above remarks, it is respectfully submitted that the rejection fails to provide sufficient rationale to modify the  $\text{PF}_6^-$  dyes of Chapman et al. by replacing the hexafluorophosphate anion with an  $\text{FAP}$  (fluoroalkylphosphate) anion. Thus, it is respectfully submitted that the disclosure of Chapman et al. (US 5,876,821), taken alone or in combination with the disclosures of Sartori et al. (US 6,210,830), Heider et al. (US 6,423,454), Lubs, and/or Busman et al. (US 5,541, 235) fails to render obvious applicants' claimed invention. Withdrawal of the rejection is respectfully requested.

The Commissioner is hereby authorized to charge any fees associated with this response or credit any overpayment to Deposit Account No. 13-3402.

Respectfully submitted,

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